CLAIMS

In the Claims:

1. An abutment for use in a bridge, said abutment comprising:

a facing wall extending substantially perpendicular to the ground;

a retaining enclosure formed in said facing wall, said retaining enclosure having a horizontally extending sill, said sill having first and second ends, and at least one wall extending perpendicularly from said sill;

a first lateral containment element connected to said first end of said sill;

a second lateral containment element connected to said second end of said sill; and

wherein said lateral containment elements are sized in design to satisfy seismic design standards including consideration of a seismic coefficient and a total mass of the bridge, the seismic coefficient and total bridge mass determining a seismic horizontal load which could be applied to said lateral containment elements by the bridge during a seismic event.

2. An abutment, as claimed in claim 1, wherein:

said lateral containment elements each include a wing wall extending laterally away from the respective ends of said sill, and mechanically stabilized earth filling the gaps between the wing walls and the respective ends of the sill.

3. An abutment, as claimed in claim 1, wherein:

said lateral containment elements each include a concrete reinforced block placed in abutting relationship with the corresponding end of the sill, said concrete block extending

laterally away from the respective end of the sill.

4. An abutment, as claimed in claim 2, wherein:

each said lateral containment elements further include a plurality of piles having a first end contained in the concrete block, and a second end extending downwardly and away from said concrete block.

5. An abutment, as claimed in claim 2, wherein:

each said concrete block has a lower portion extending below said sill thus forming a shear key.

6. An abutment, as claimed in claim 1, wherein:

each said lateral containment device includes a plurality of piles positioned adjacent said first and second ends of said sill, said piles having a lower end extending below ground and having an upper end which extends above ground.

7. An abutment, as claimed in claim 6, wherein:

at least one of said plurality of piles is connected to a portion of the facing wall extending below the sill by mechanically stabilized earth.

8. An abutment, as claimed in claim 1, further including:

a bearing member resting on said sill and extending laterally beyond said retaining enclosure through respective side walls defining lateral ends of said retaining enclosure, and said bearing member further extending into the lateral containment elements.

9. An abutment, as claimed in claim 1, wherein:

said sill includes a slab of reinforced concrete.

10. An abutment, as claimed in claim 1, wherein:

said facing wall includes a first portion extending below the sill and having first and second ends, second portions extending laterally away from said first and second ends of said first portion, facing wing extensions extending laterally away from each said second portions, and mechanically stabilized earth being emplaced behind said facing wall to support said facing wall along said first portion, said second portions, and said facing wing extensions.

11. An abutment for use in a bridge, said abutment comprising:

a facing wall extending substantially perpendicular to the ground;

a retaining enclosure formed in said facing wall, said retaining enclosure having a horizontally extending sill, said sill having first and second ends, and at least one wall extending perpendicularly from said sill;

a first means for limiting lateral displacement of the bridge connected to said first end of said sill;

a second means for limiting lateral displacement of the bridge connected to said second end of said sill; and

wherein said first and second means for limiting lateral displacement of the bridge are sized in design to satisfy seismic design standards including consideration of a seismic coefficient and a total mass of the bridge, the seismic coefficient and total bridge mass determining a seismic horizontal load which could be applied to said first and second means for limiting lateral displacement of the bridge during a seismic event.

12. An abutment, as claimed in claim 11, wherein:

said first and second means for limiting lateral displacement of the bridge each include a wing wall extending laterally away from the respective ends of said sill, and mechanically stabilized earth filling a gap between the wing wall and the respective end of the sill.

13. An abutment, as claimed in claim 11, wherein:

said first and second means for limiting lateral displacement of the bridge each include a concrete reinforced block placed in abutting relationship with the corresponding end of the sill, said concrete block extending laterally away from the respective end of the sill.

14. An abutment, as claimed in claim 13, wherein:

each said means for limiting lateral displacement of the bridge further include a plurality of piles having a first end contained in the concrete block, and a second end extending downwardly and away from said concrete block.

15. An abutment, as claimed in claim 13, wherein:

each said concrete block has a lower portion extending below said sill thus forming a shear key.

16. An abutment, as claimed in claim 11, wherein:

each said means for limiting lateral displacement of the bridge includes a plurality of piles positioned adjacent said first and second ends of said sill, said piles having a lower end extending below ground and having an upper end which extends above ground.

17. An abutment, as claimed in claim 16, wherein:

at least one of said plurality of piles is connected to a portion of the facing wall extending below the sill by mechanically stabilized earth.

18. An abutment, as claimed in claim 11, further including:

a bearing member resting on said sill and extending laterally beyond said retaining enclosure through respective side walls defining lateral ends of said retaining enclosure and said bearing member further extending into the first and second means for limiting lateral displacement of the bridge.

19. An abutment, as claimed in claim 11, wherein:

said sill includes a slab of reinforced concrete.

20. An abutment, as claimed in claim 11, wherein:

said facing wall includes a first portion extending below the sill and having first and second ends, second portions extending laterally away from said first and second ends of said portion, facing wing extensions extending laterally away from each said second portions, and mechanically stabilized earth being emplaced behind said facing wall to support said facing wall along said first portion, said second portions, and said facing wing extensions.

21. A method of constructing a bridge abutment comprising the steps of:

building a facing wall extending substantially perpendicular to the ground;

back filling the facing wall;

forming a retaining enclosure including a horizontally extending sill and at least one side wall communicating with said sill, said sill having opposing lateral first and second ends;

positioning a first lateral containment element abutting said first lateral end of said sill and positioning a second lateral containment element abutting said second lateral end of said sill, each said lateral containment element extending laterally away from said sill, said lateral containment elements being sized in design to satisfy seismic design standards including consideration of a seismic coefficient and a total mass of the bridge, the seismic coefficient and total bridge mass determining a seismic horizontal load which could be applied to said lateral containment elements by the bridge during a seismic event.

22. A method, as claimed in claim 21, wherein said building and back filling steps further comprise the steps of:

laying a first level of units forming a first level of the facing wall;

laying a first reinforcing layer adjacent said first units, and extending one end of said first reinforcing layer over said first units;

back filling the first units over the first reinforcing layer with a first lift of earth, and then folding back the first reinforcing layer to cover the first lift;

laying a thin second lift of earth over the folded back first reinforcing layer;

laying a second reinforcing layer over the thin second lift; and

laying a thin third lift of earth over the second reinforcing layer.

23. A method, as claimed in claim 22, wherein:

the steps are performed and repeated in sequence to build the facing wall of a desired height with back fill which is reinforced with the reinforcing layers.